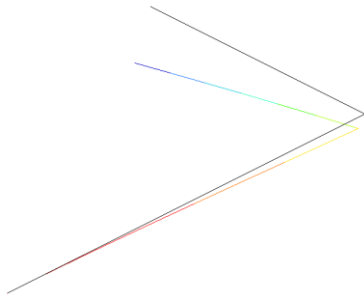


Solution**1. (40 pts)**

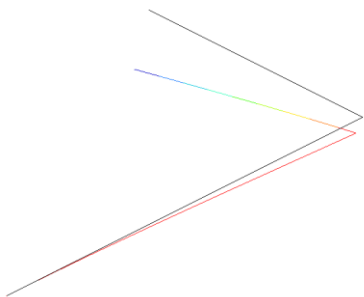
(1) 1D 빔 모델로 선형 해석을 진행하고 하중 방향 최대 변위를 구하시오. (10 pts)



Max. displacement (z): -125.2 mm

Max. displacement (x): -26.3 mm

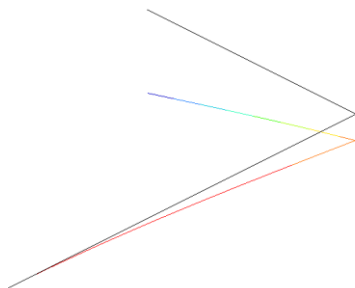
(2) 1D 빔 모델로 기하 비선형 해석을 진행하고 하중 방향 최대 변위를 구하시오. (15 pts)



Max. displacement (z): -127.2 mm

Max. displacement (x): -30.6 mm

(3) 1D 빔 모델로 중동력(follower load)을 고려한 기하 비선형 해석을 진행하고 하중 방향 최대 변위를 구하시오. (15 pts)

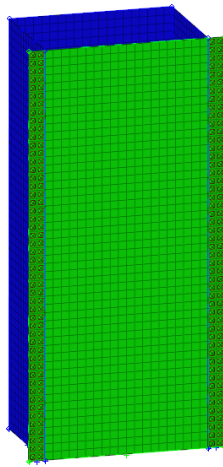


Max. displacement (z): -183.6 mm

Max. displacement (x): -13.3 mm

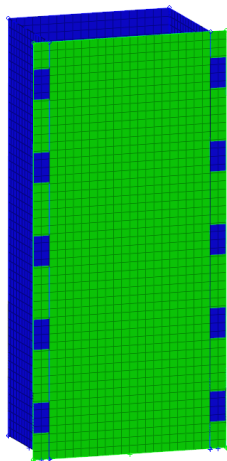
2. (30 pts)

(1) 두 개의 파트가 일체 접착 거동인 경우를 모델링 하시오. (요소 크기: 10 mm) (5 pts)



(일체 접착)

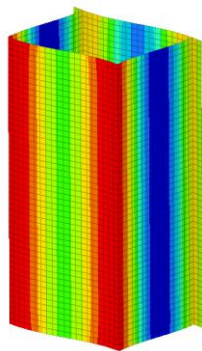
(2) 두 개의 파트가 용접 연결인 경우를 모델링 하시오. (용접 연결은 '노드공유법' 이용) (5 pts)



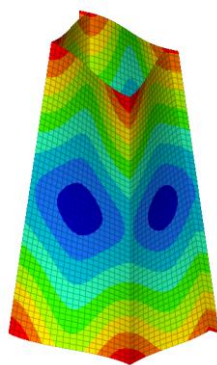
(용접 연결)

(3) 두 연결 조건에 대해 모드 해석을 진행하고 비교하시오. (구속조건 없는 자유진동 가정) (10 pts)

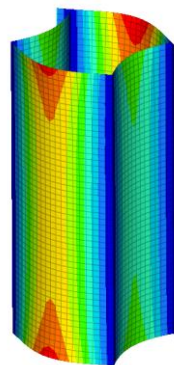
일체 접착 거동



Mode7: 4.3387E+01 Hz

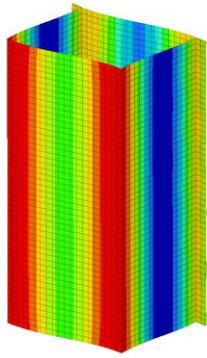


Node8: 4.4241E+01

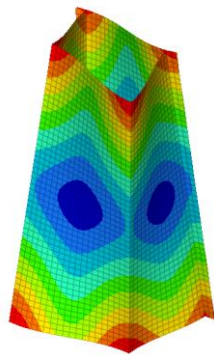


Mode 9: 7.4995E+01

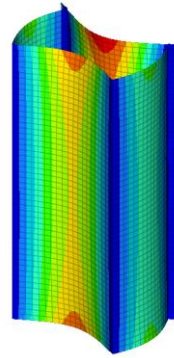
용접 거동



Mode7: 4.2201E+01 Hz



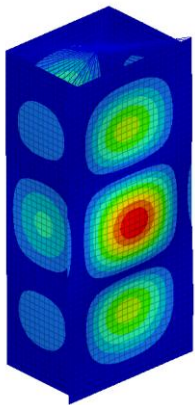
Mode8: 4.3119E+01 Hz



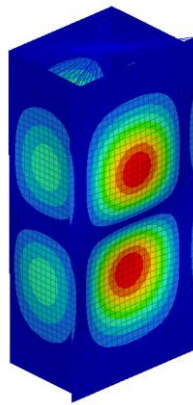
Mode9: 7.4390E+01 Hz

(4) 두 연결 조건에 대해 좌굴 해석을 진행하고 비교하시오. (10 pts)

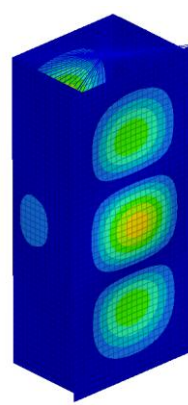
일체 접착 거동



Mode 1: 3.4331E+00 Hz

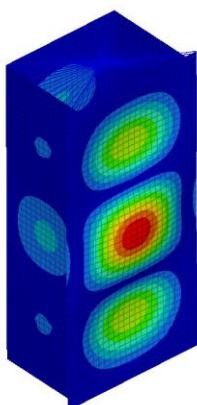


Mode 2: 3.4381E+00 Hz

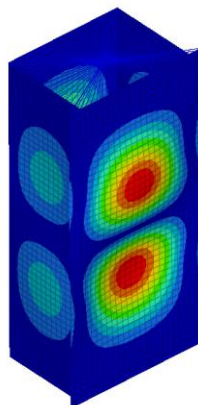


Mode 3: 3.7612E+00 Hz

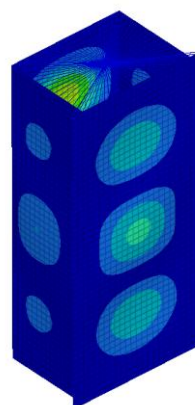
용접 거동



Mode1: 3.3297E+00 Hz



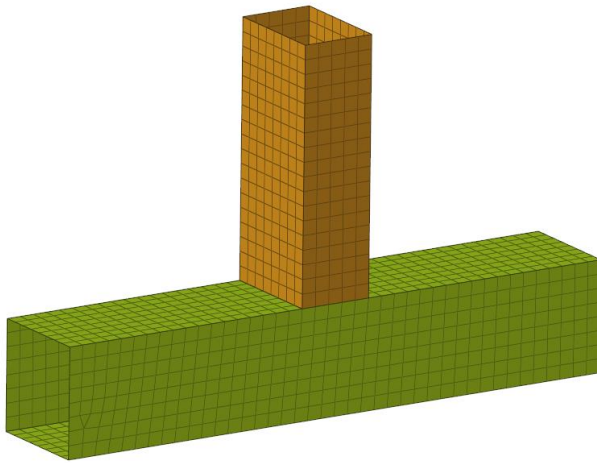
Mode2: 3.3425E+00 Hz



Mode3: 3.6753E+00 Hz

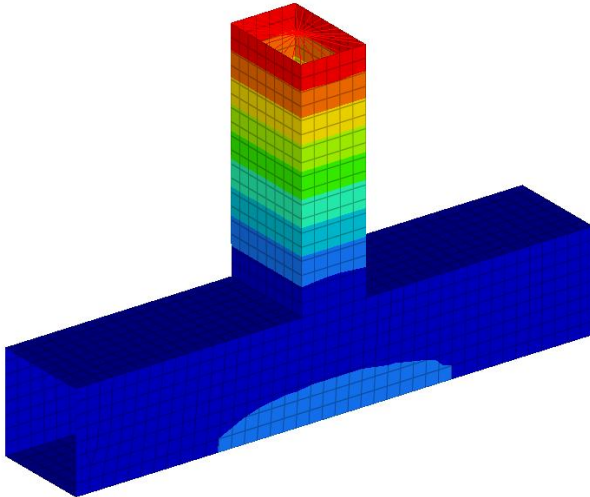
3. (30 pts)

(1) 단면 정보를 바탕으로 2D 쉘 조인트 모델링을 진행하시오. (Bulkhead가 없는 모델) (5 pts)



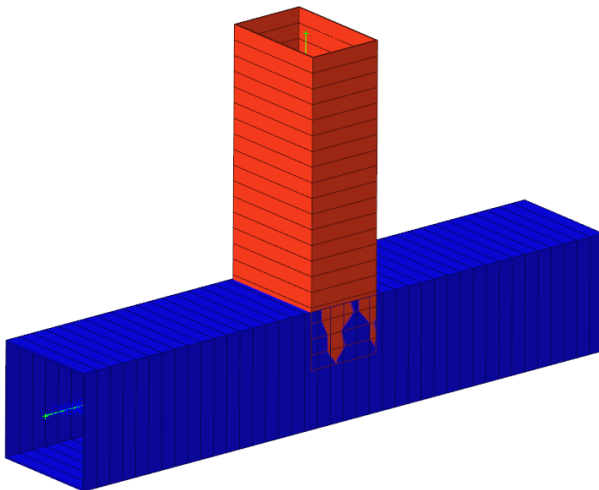
(2D 쉘 모델링)

(2) 선형 해석을 진행하고 최대 변위를 구하시오. (10 pts)



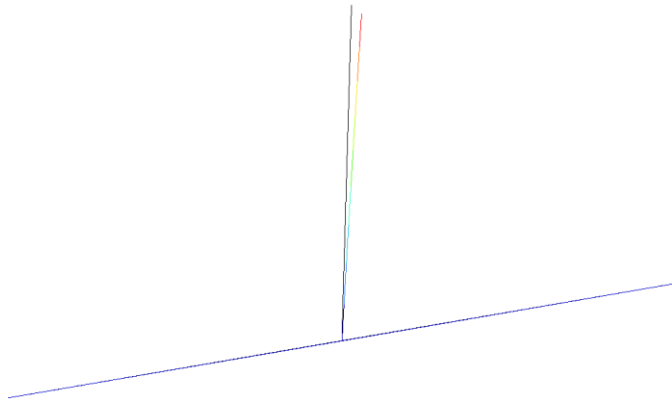
Max. displacement: 1.279 mm

(3) 쉘 모델에 대한 1D 빔 조인트 모델링을 진행하시오. (5 pts)



(1D 빔 모델링)

(4) 쉘 모델과 동일한 강성을 갖는 1D 빔 조인트 모델의 스프링 강성을 구하고 선형 해석을 수행 하시오. (10 pts)



Max. displacement: 1.275 mm

K4 spring stiffness: 1.6163E+09

[채점 기준]

해석 파일 미제출: -3

오답 (해석 절차 부족): -3

미제출: 점수 없음

해석 시도: +3